ATTACHMENT A

CITY OF FRESNO
TRAFFIC ENGINEERING DIVISION
TRAFFIC SIGNAL AND STREETLIGHT MAINTENANCE

Guidelines for Routine Maintenance

February 7, 2000

General: Routine maintenance is intended to ensure reliable mechanical and electrical operation of the field equipment. The following guidelines should be used to ensure a comprehensive inspection.

Types: Four (4) types of inspections/maintenance will be used to periodically service the field equipment.

Type	Inspection/Maintenance	Frequency
1	Operational Check/Solid State and 170 Controllers	6 months
2	Conflict Monitor Unit Test	6 months
3	Operational Check/Fixed Time Controllers	6 months
4	Group Re-Lamping/Traffic Signals	24 months

Visual Inspection: As much as practical should be done visually. Avoid disturbing cables, connections and components if at all possible. Check for connector and component seating by inserting or tightening only.

Guidelines: All abnormal conditions should be repaired as a part of the inspection. If this is not practical, it may be deferred. All deferred work must be listed on the inspection work order. The Electrician is responsible for following up and completing the deferred items in a timely manner. If additional support or materials are needed, the Electrician will coordinate these with the Supervisor.

Documentation: When completed, the routine will be documented on the appropriate work order form and in the cabinet maintenance record.

Type 1 – Operational Check/Solid State & 170

1. Cabinet:
    - Replace filters (Upgrade if needed).
    - Lubricate locks & hinges as needed.
    - Check fan and thermostat operation.
    - Check for evidence of water leakage (caulk/seal as needed).
    - Check conduit sealant.
    - Check gaskets & seals (lubricate if needed).
    - Remove graffiti, tape residue, signs etc.
    - Spot paint/prime as needed.
    - Inspect wiring and terminations for burnt terminals and/or damaged insulation.
    - Test GFI receptacle prior to use.
    - Vacuum or Blow accumulated dirt/debris.

2. Controller:
    - Observe indicators for proper operation.
    - Check phase extension per actuations.
    - Verify that cards or modules are properly seated.
    - Verify that connectors are secure.
    - Verify operation/timing per timing sheet.

3. Conflict Monitor:
    - Verify CMU operation by shorting two conflicting field terminals together.
    - Reset the monitor.
    - Observe indicators for proper operation.
    - Inspect ribbon cable on Plus-Monitors for damage.
    - Verify that the program card is properly seated.
    - Verify that connectors are secure.

4. Switch Packs:
    - Observe indicators for proper operation.
    - Verify that the switch is properly seated.

5. Flashers:
    - Observe indicators for proper operation.
    - Verify that the switch is properly seated.
    - Check flash operation (cabinet & Police).

6. Relays:
    - Check for burnt or overheated contacts.
    - Verify that the relays are properly seated.

7. Clocks:
    - Check for correct time/DOW setting.
    - Manually verify output switch operation.

8. Preemption:
    - Simulate actuation and verify proper operation.

9. Coordination:
    - Observe that current plan is per TOD.
    - Check for correct time/DOW setting.

10. Signal Heads:
    - Inspect alignment and visibility.
    - Check for broken lenses
    - Check for burned-out lamps.
    - Check for missing/damaged visors.
    - Check for missing/damaged back-plates.

11. Poles & Mast arms:
    - Check for missing/damaged H/H covers.
    - Check anchor bolt hardware for tightness.
    - Check condition of grout.
    - Check plumb of pole.
    - Check for damage/dents etc.
    - If painted, spot paint/primer as needed.
    - Remove graffiti, tape residue, signs etc.

12. Pedestrian Push Buttons:
    - Check all buttons for operation.
    - Check signs for legibility.
    - Verify Isolator input and signal operation.

13. Detector Loops:
    - Inspect roadway along loop perimeter for exposed wire/conduit, potholes and/or missing sealant.

14. Detector Amplifiers:
    - Check that vehicles are being detected.
    - Verify that appropriate call is registered on controller.

15. Pull Boxes:
    - Check box and lid for proper fit and legend.
    - Check box and lid for breakage/cracking.
    - Check cables/wires for damaged insulation.

- Remove accumulated dirt/water.
- Treat for insects if needed.
- Check condition of grout.
- Check for missing or damaged delineator posts.
- Check conduit sealant.

16. Electrical Service:
    - Check lock for serviceability.
    - If pedestal; check meter window for clarity.
    - Remove graffiti, tape residue, signs etc.
    - Check conduit sealant.
    - If pole mounted; a) inspect conduit for damage, b) check ground connection for tightness.

Type 2 - Conflict Monitor Unit Test

1. Generals:
    - Place the intersection in flash mode.
    - Remove and test the monitor using the MT-180 Tester using
    - Repair/Adjust as necessary to meet test parameters. (Faults that do not adversely affect the safe operation of the signal are tolerable. They must be documented with a full explanation of the circumstances.)
    - Reinstall the tested monitor & restore the signal to full operation.
    - Complete the necessary documentation.
    - Verify conflict operation by shorting two conflicting field terminals together.
    - Reset the Monitor.
    - Inspect the cables and connector for damage.
    - Verify that the program card is properly seated.
    - Verify that all connectors are secure.
    - Verify that all connectors are secure.

Type 3 - Operational Check/Fixed Time

1. Cabinet:
    - Lubricate locks and hinges as needed.
    - Check for evidence of water leakage (caulk/seal as needed).
    - Check conduit sealant.
    - Check gaskets & seals (lubricate as needed).
    - Remove graffiti, tape residue, signs etc.
    - Spot paint/prime as needed.
    - Inspect wiring and terminations for burnt terminals and/or damaged insulation.

- Vacuum accumulated dirt/debris. No compressed air should be used to blow off dust.

2. Controller:
   - Replace controller unit with a refurbished unit from stock.
   - Verify interval timing per timing sheet.
   - Verify that connector is secure.

3. Flasher:
   - Verify that the flasher is properly seated.
   - Check flash operation.

4. Relays:
   - Check for burnt or overheating contacts.
   - Verify that all relays are properly seated.

5. Clocks:
   - Verify correct time/DOW setting.
   - Manually verify output switch operation

6. Coordination:
   - Check sync pulse input.
   - Verify dial dwells with absence of sync pulse.
   - Verify re-sync when pulse is restored.

7. Signal Heads:
   - Inspect alignment and visibility.
   - Check for broken lenses.
   - Check for burned out lamps.
   - Check for missing/damaged visors.
   - Check for missing/damaged back-plates.

8. Poles & Mast-arms:
   - Check for missing/damaged H/H covers.
   - Check anchor bolt hardware for tightness.
   - Check condition of grout.
   - Check plumb of pole.
   - Check for damage/dents etc.
   - If painted, spot paint /primer as needed.
   - Remove graffiti, tape residue, signs etc.

9. Pull Boxes:
   - Check box and lid for proper fit and legend.

- Check box and lid for breaking /cracking
- Remove any accumulated dirt/water.
- Treat for insects if needed.
- Check condition of grout.
- Check for missing or damaged delineator posts.
- Check conduit sealant.

10. Electrical Service:
    - Check lock for serviceability.
    - If Pedestal, check meter window for clarity.
    - Remove graffiti, tape residue, signs etc.
    - If pole mounted; a) inspect conduit for damage, b) check ground connection for tightness.